

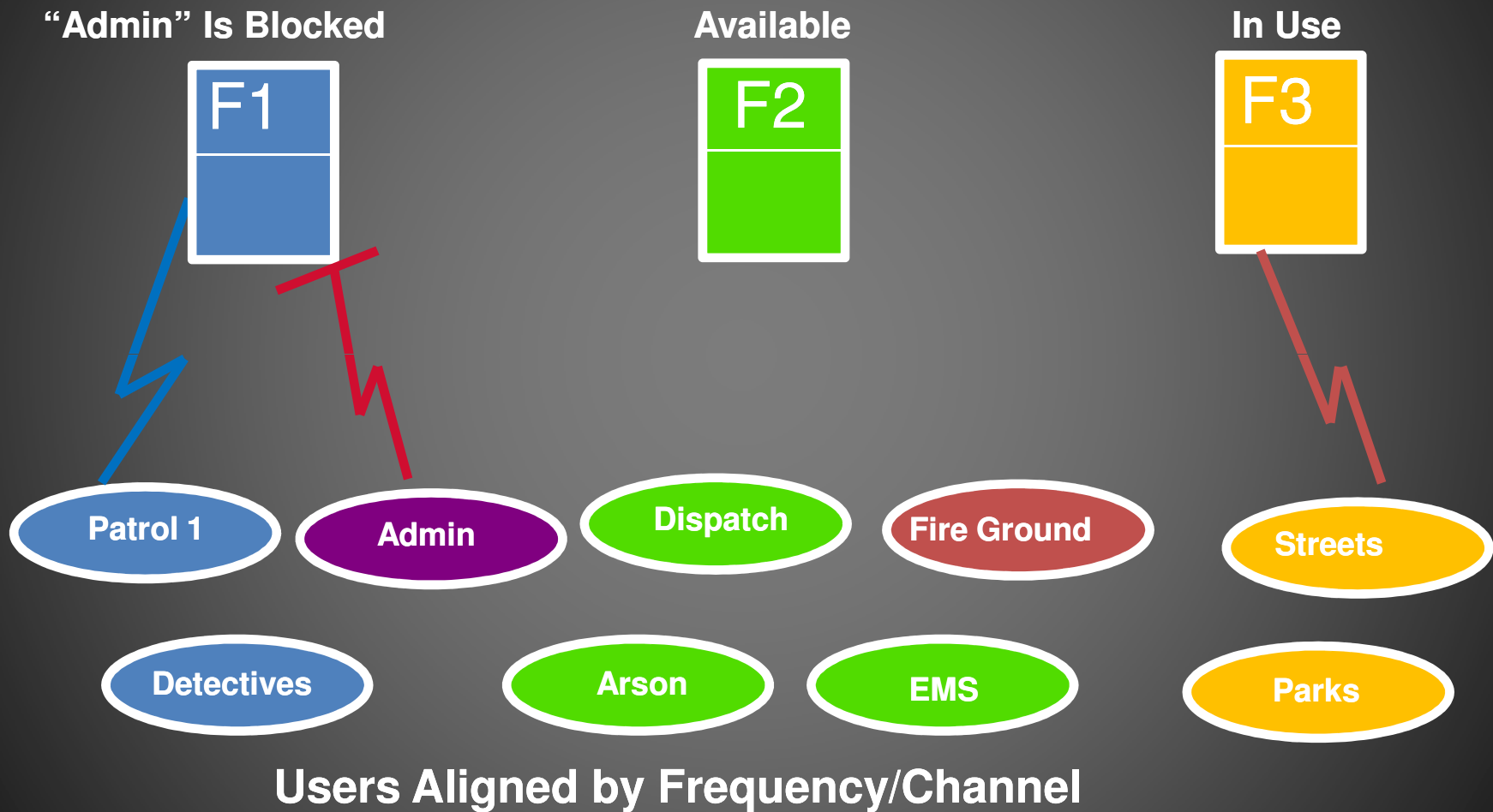
Agenda

- **Trunking Basics**
- **Evolution of Public Safety Standards**
- **Wide Area Roaming**

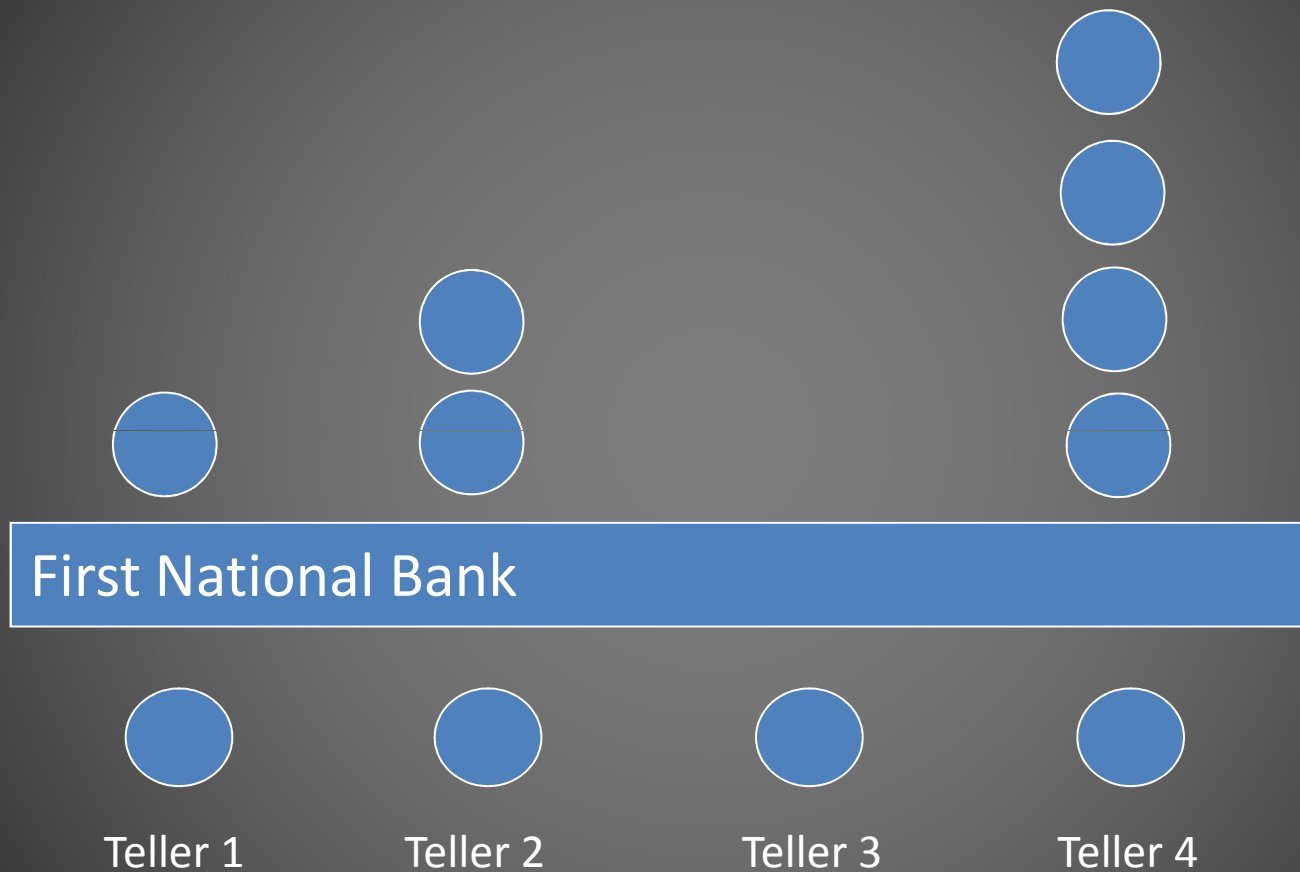
Trunking?

- **Concept Developed by Telephone Company to Make Most Efficient Use of Resources**
- **Automates Process of Selecting Communications Channel Based on Availability**
- **Insures Calls Heard by Only Those That Need To**
- **Introduction of Microprocessors in mid 70's Enabled Trunking in Two-way Radio Systems**
 - **Intelligence in Subscribers and Infrastructure**
- **Digitally Controlled Access and Computerized Switching**
 - **Fast**
 - **Supports Enhanced Features**

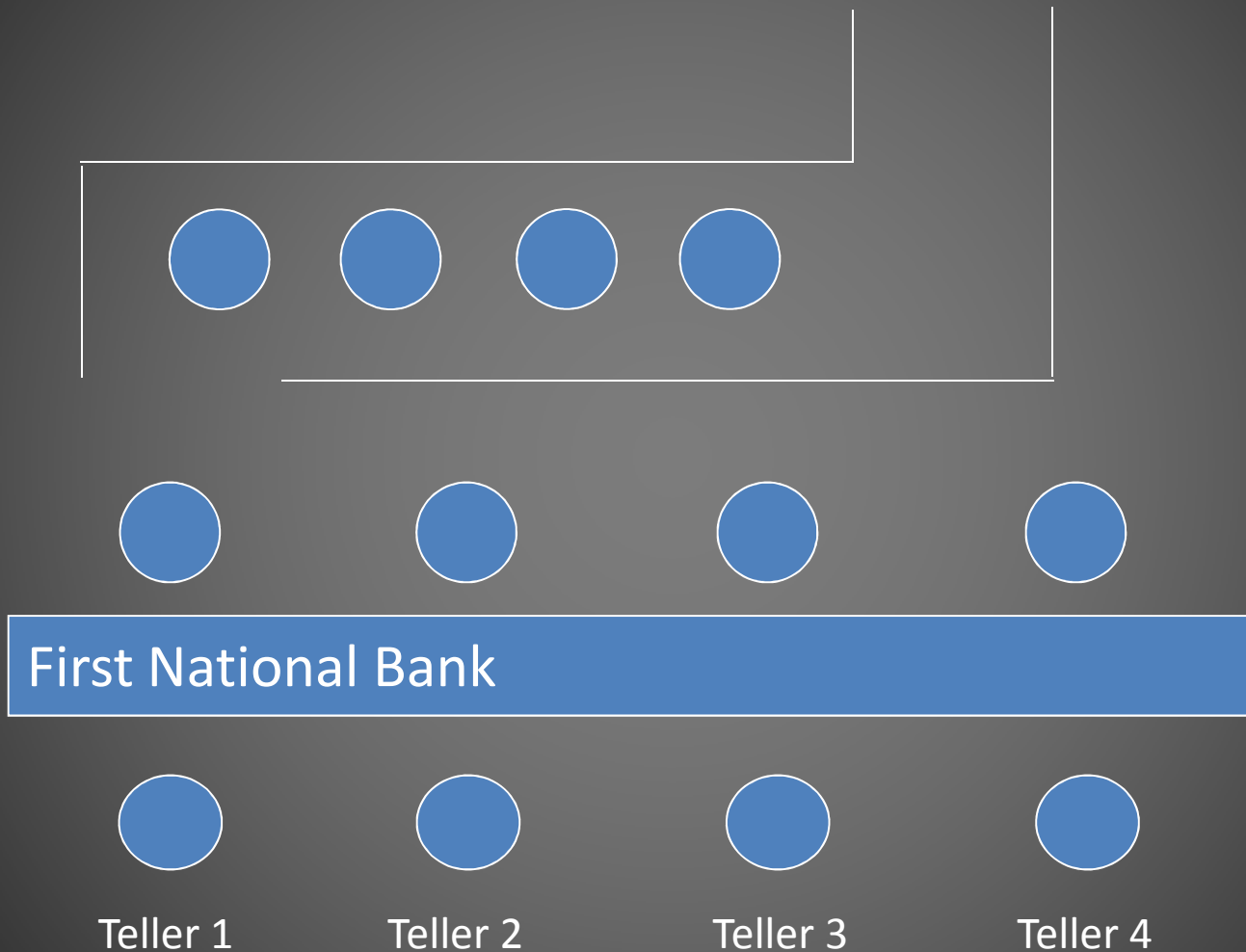
Conventional Channel Operation



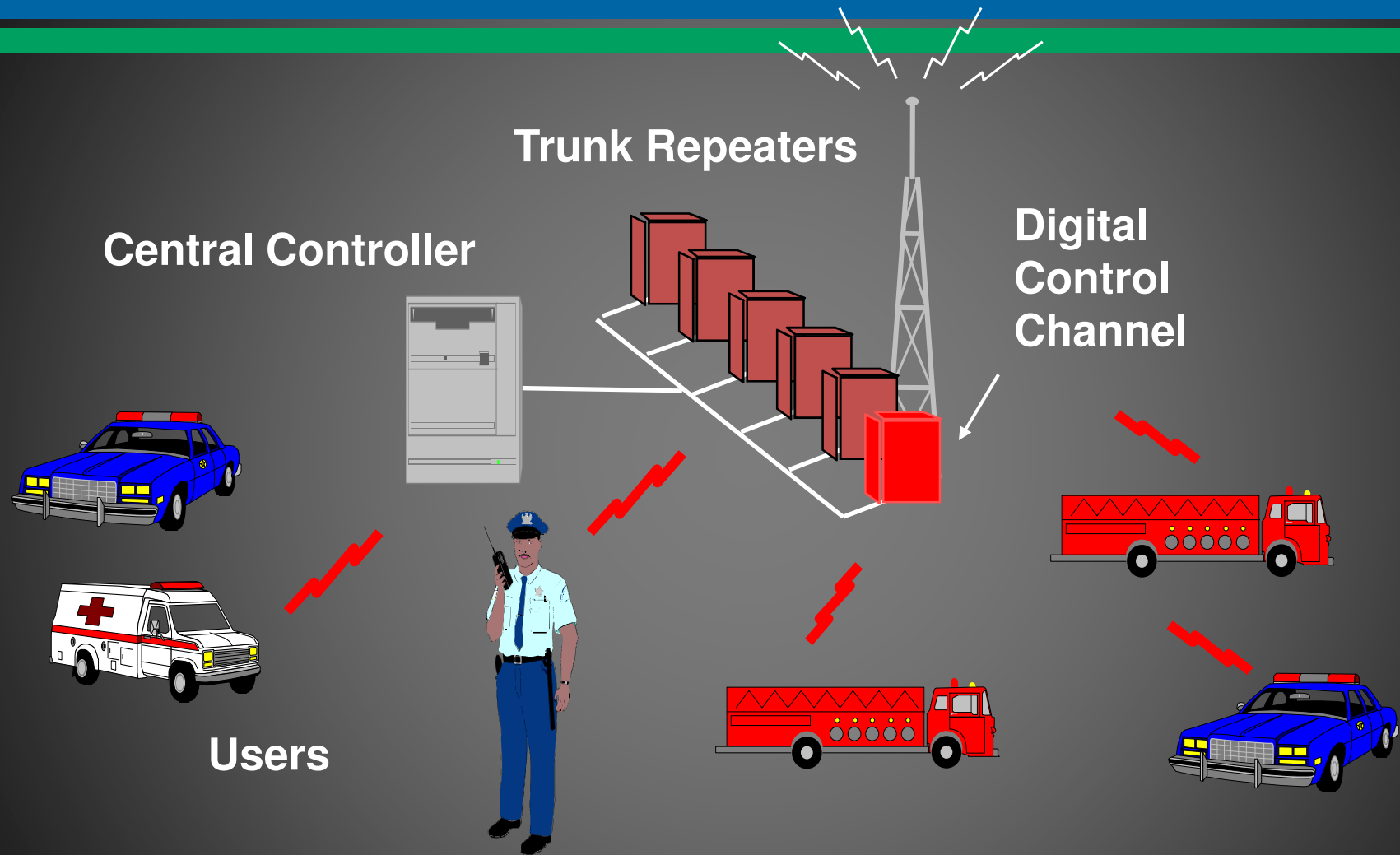
Conventional Radio



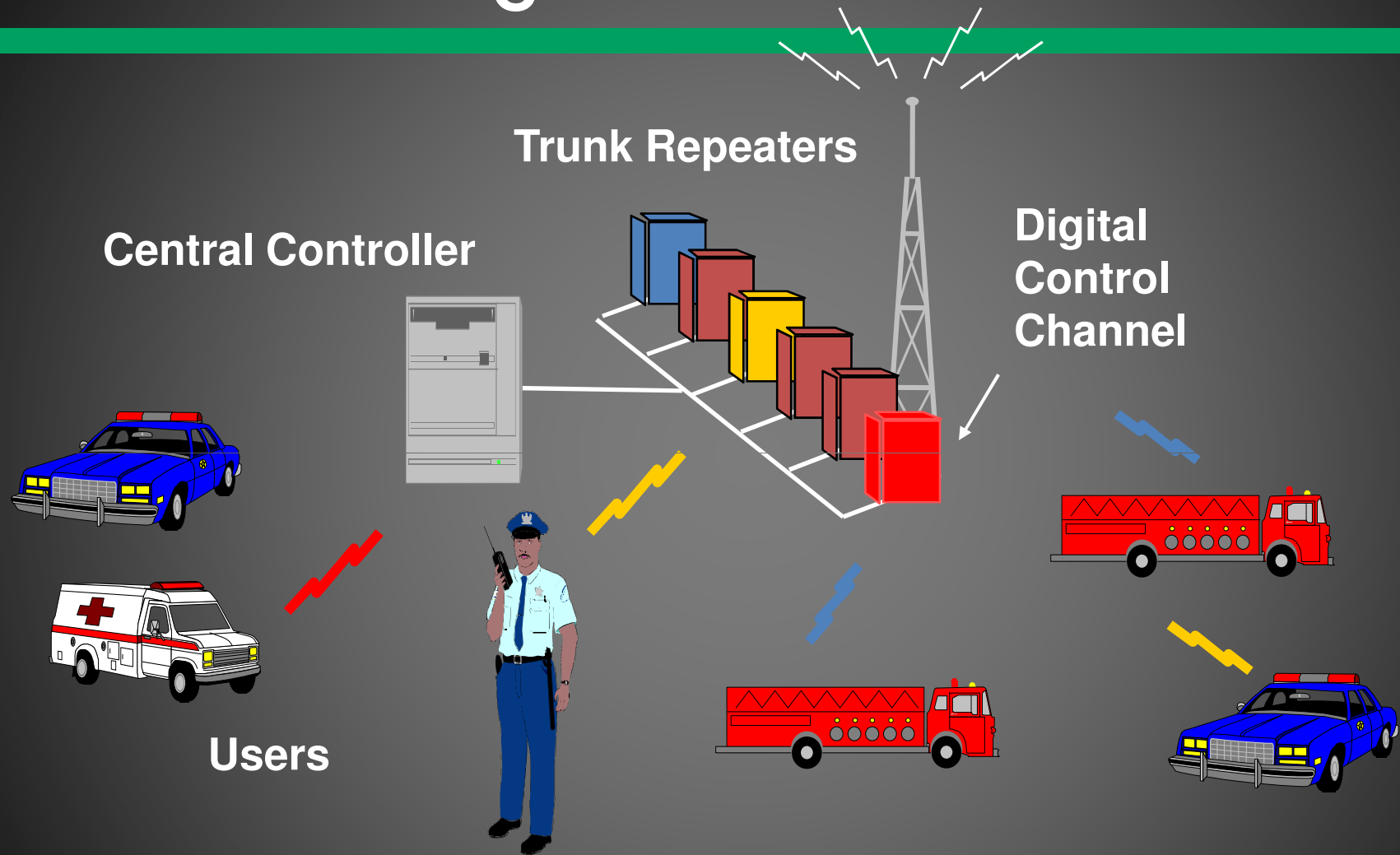
Trunked Radio



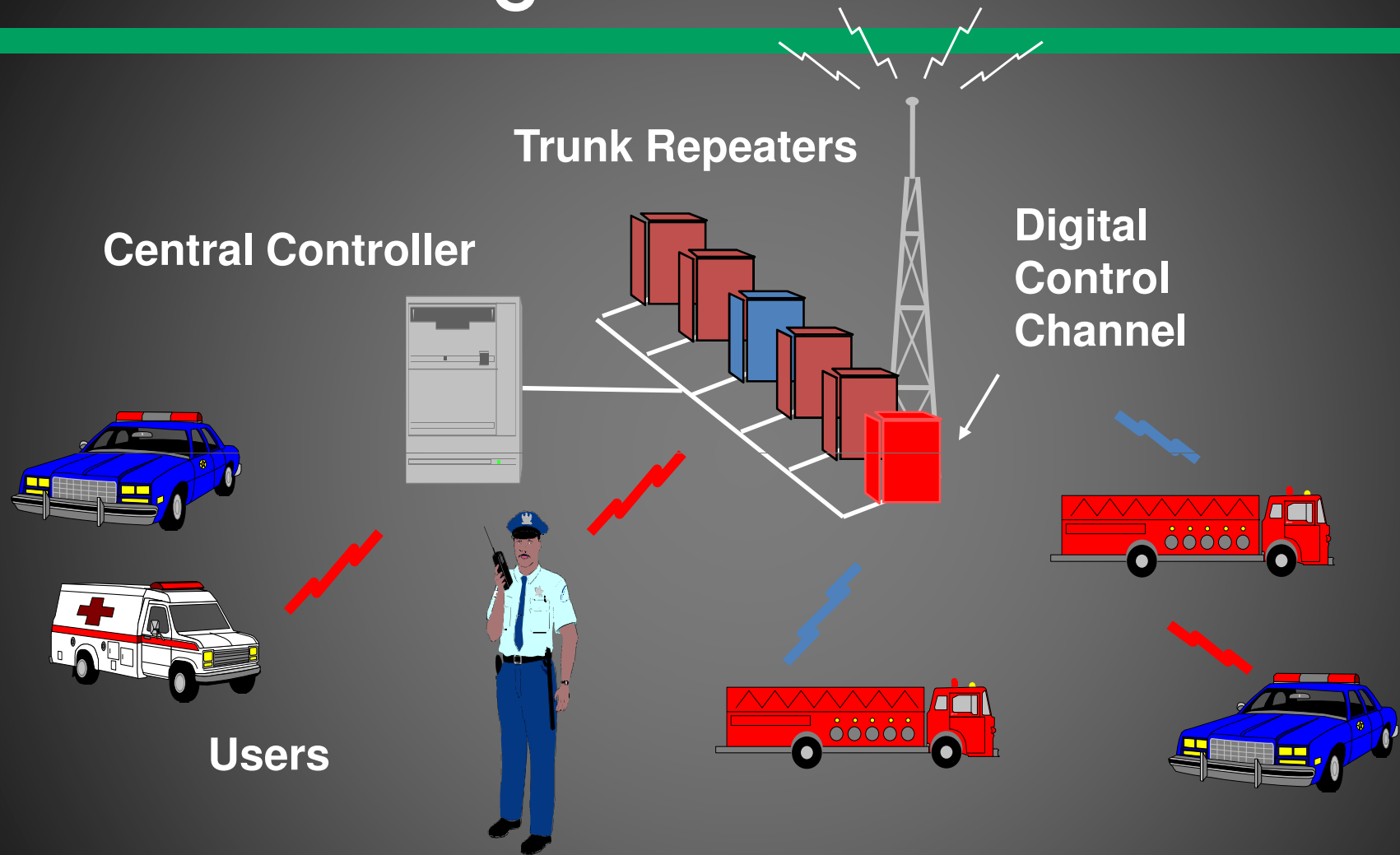
Radio Trunking



Radio Trunking



Radio Trunking



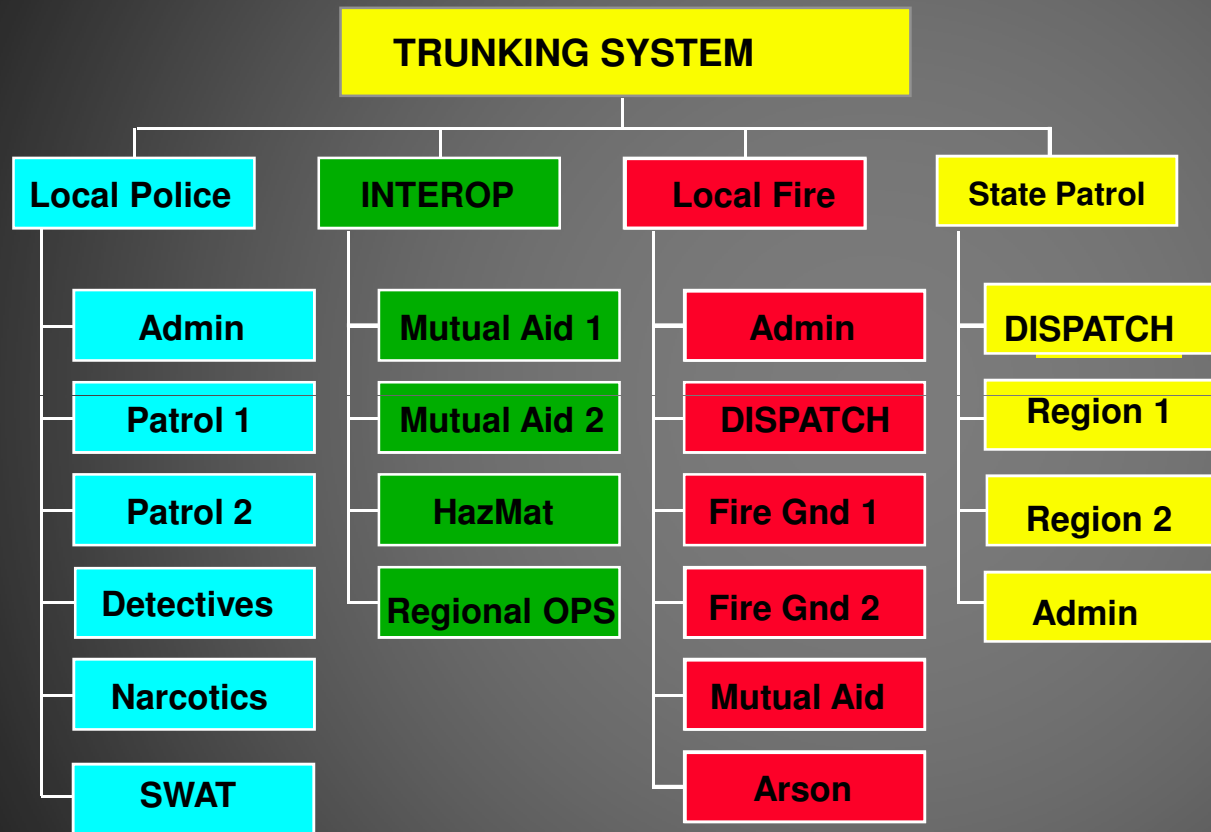
Computer Controlled Radio Trunking

- Radio's Communicate in Functional Groups Called Talkgroups.
- Talkgroups are Defined by Software, not Frequencies.
- Different Modes on Radios Correspond to Different Talkgroups.
 - System Updated Each Time Radio Turned On/Off or Talkgroup Changed
- System Can Assign Any Available Channel, Automatically Each Time You Communicate.

Talkgroup Partitioning

- **Talkgroup = Channel to Users**
- **Trunking Provides More Talkgroups Than Actual Number of Frequencies**
- **Communications Within Talkgroup are Private**
- **Talkgroups May Be Created To Support Interoperability Across Regions, Agencies & Departments**

Talkgroup Fleet Map

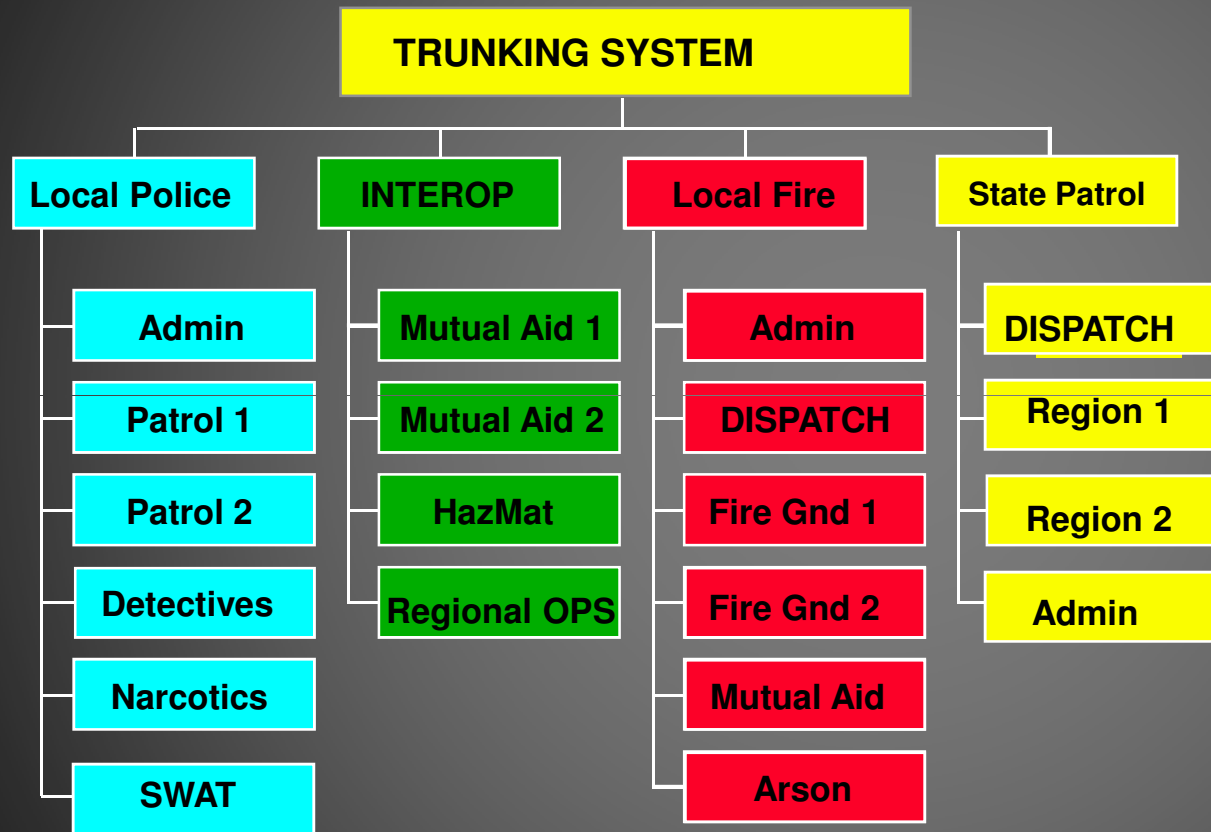


Trunking Talkgroup = Channel



Local PD Radio

Talkgroup Fleet Map



Trunking Talkgroup = Channel



State Patrol Radio

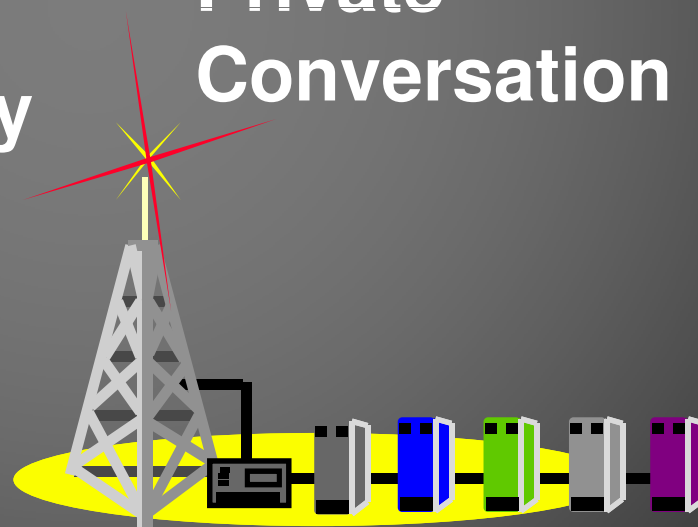
System Access Recap

- Push the Push-to-talk button – the rest is automatic
- Typically 500ms to 750ms from channel request - channel grant
- Tone alert if system is busy
- Queuing and Call Back tone when channel granted
- Out of range -- different tone



Basic Trunking Features

- PTT-ID
- Talkgroup Call
- Multigroup Call
- Automatic Retry
- Recent User Priority
- Continuous Assignment Updating
- Misdirected Radio Protection
- Call Alert
- Private Conversation



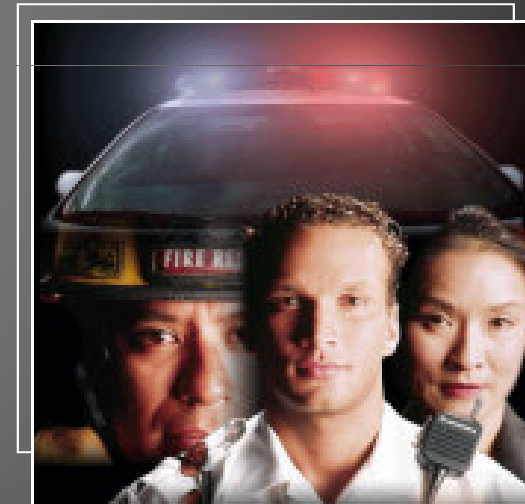
Trunking for Public Safety?

- LEAA Funded Study by APCO
- Establish Minimum & Desirable Requirements for Public Safety Trunked Radio Systems
- APCO Project 16 Published 1979
 - Public Safety Trunking Definition
 - Functional Requirements
 - Proprietary Protocols

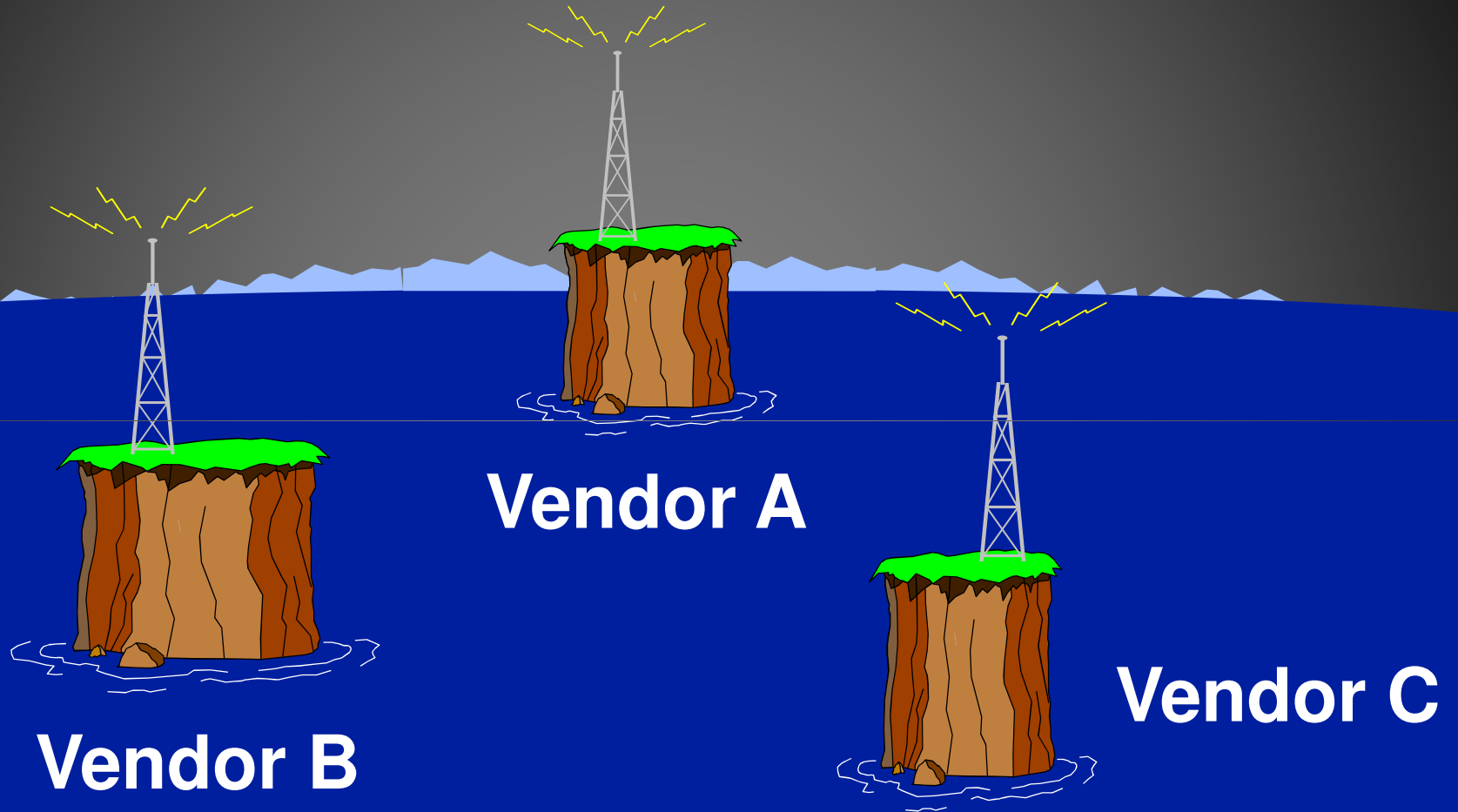


Project 16 Trunking Standards

- **Defined Public Safety Trunking Functional Standards**
 - Dedicated Signaling Channel
 - Multiple Priority Levels
 - Queuing and Call Back
 - Unit ID
 - Emergency Call & Alarm
 - Fast Access
 - Dynamic Regrouping
 - Selective Radio Inhibit
 - Console Interface
 - Mobile/Portable Talk-Around



Project 16: Great Technology, But No Interoperability



Project 25 Digital Standards

- **Digital Technology Compliant with P25 Standards**
 - **Incorporates P16 Functional Requirements**
 - **Technical Specifications Defining Open Architecture Network**
 - **Widespread Endorsement & Participation**
 - International Association of Chiefs of Police
 - National Sheriffs Association
 - National Association of State Telecommunications Directors
 - American National Standards Institute
 - All Federal Agencies
- **Phase I Complete, Published as ANSI/EIA/TIA 102**
- **Phase II TDMA Well Underway**
 - **Backwards Compatible with Phase I**
 - **Defining Inter Sub-System Interface (ISSI) for System Level Roaming and Interoperability**

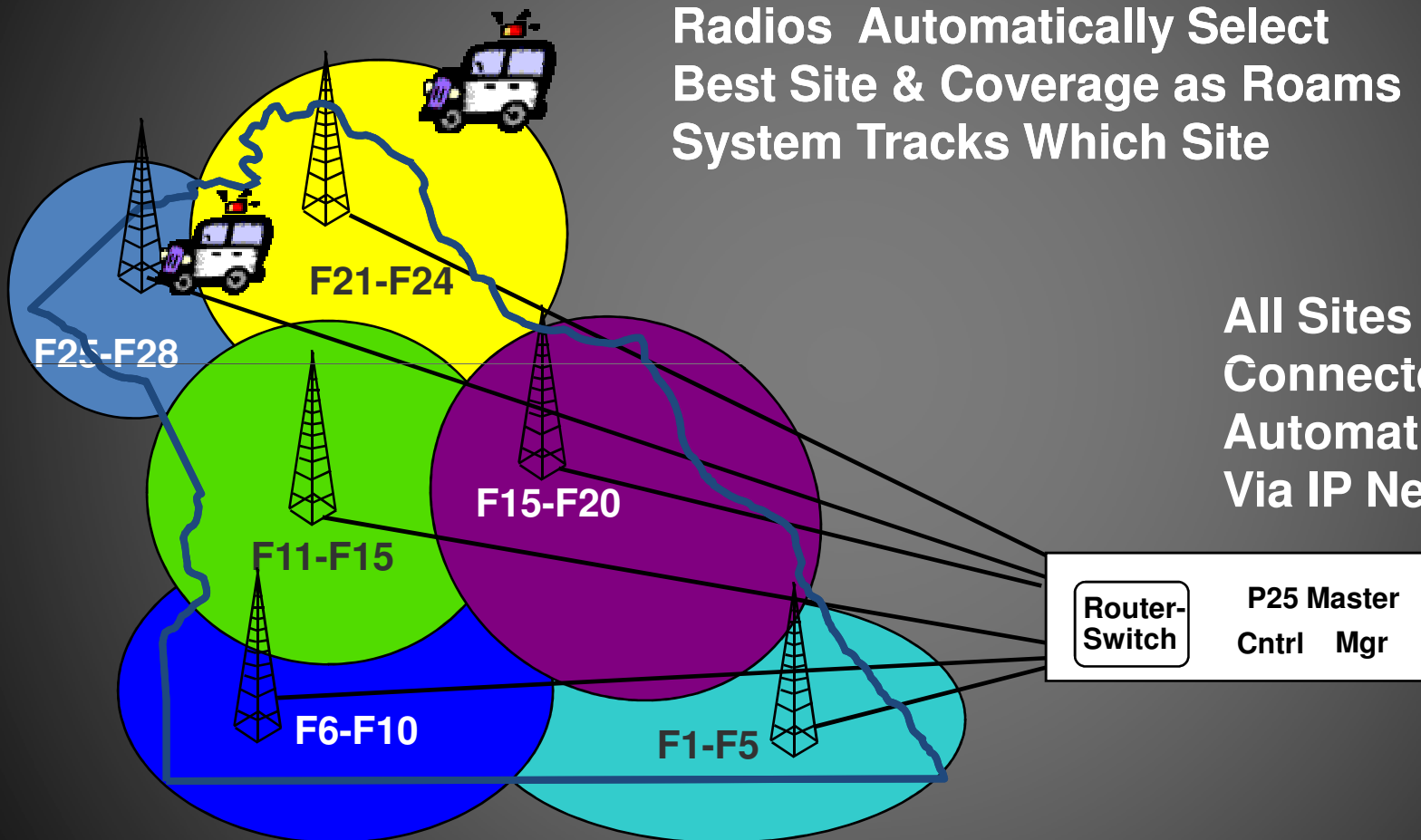
Current Generation Wide Area Networks

- **Intelligent Multi-Site Network - Easy to Use**
 - Completely Automatic Processing of Calls
 - Less Congestion, Faster Access
 - Enhanced Feature Set for Ease of Use and Effective Communications
- **Sophisticated Roaming Software**
 - Automatic Subscriber Registration with “Best Site”
 - Automatic Queuing and Callback With Priority Level Access

Multi-Site Automatic Roaming

Radios Automatically Select
Best Site & Coverage as Roams
System Tracks Which Site

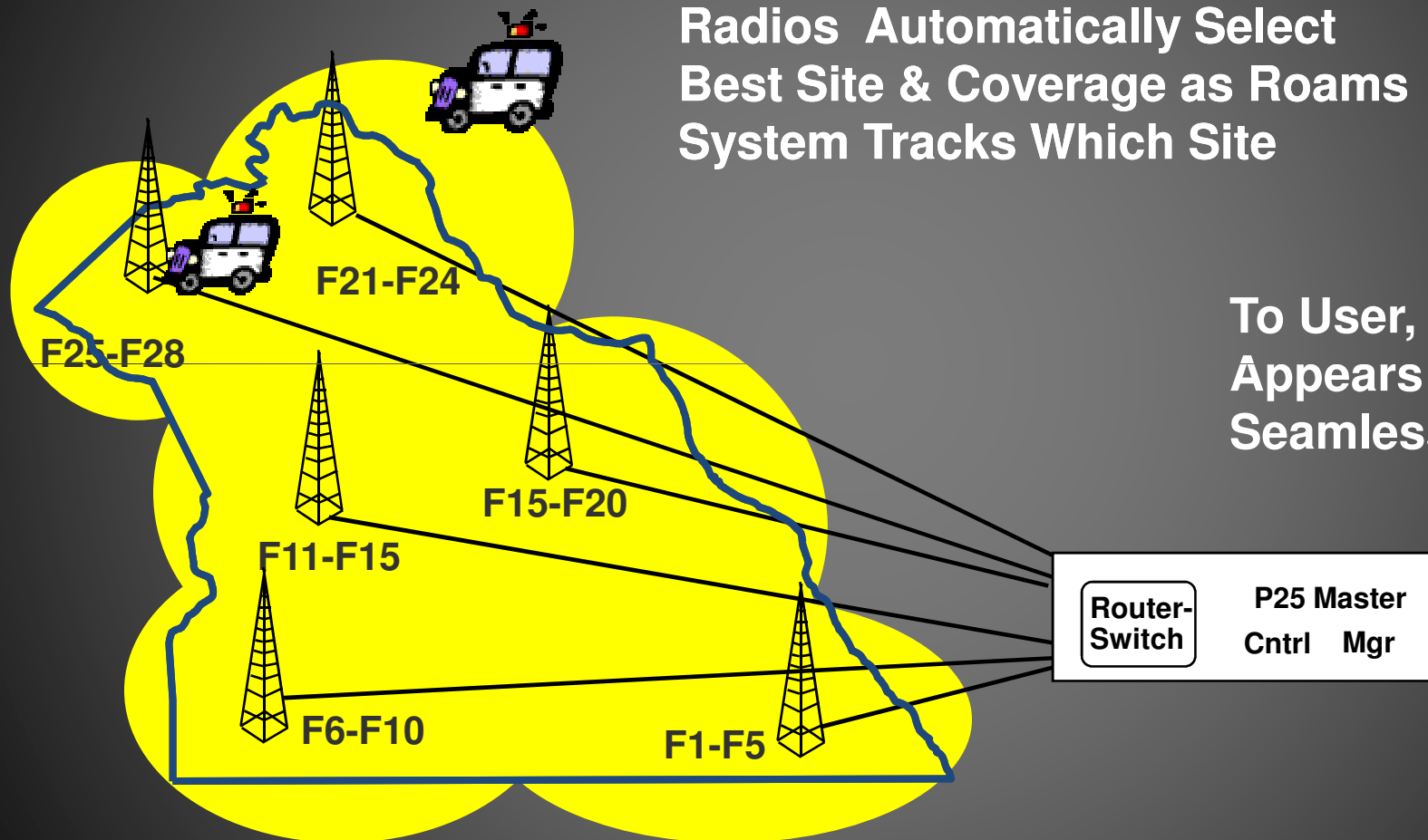
All Sites
Connected To
Automatic Switch
Via IP Network



Multi-Site Automatic Roaming

Radios Automatically Select
Best Site & Coverage as Roams
System Tracks Which Site

To User,
Appears as
Seamless Coverage



Thank You!

Questions?